In This Issue

Research Partnership

Collaboration between ESDCD and NAS

The ESDCD is moving forward with a research partnership with the NASA Advanced Supercomputing (NAS) Division at NASA Ames Research Center (ARC). The partnership forms a joint approach to address supercomputing issues within NASA's Aerospace Technology Enterprise (Code R) and Earth Science Enterprise (ESE) (Code Y), and it provides a means to expedite the movement of leading edge technology into a production environment. ARC's principal contribution is investigating new technologies and improving them for production environments, while GSFC will assimilate the knowledge gained into future procurement activities to provide a robust computing environment for users. Code Y contributes benchmark codes and funding and will gain access to the test resources. The initial collaboration has focused on JPL's Estimating the Circulation and Climate of the Ocean (ECCO) project, which studies ocean circulation via high-resolution numerical simulation and data assimilation techniques. NAS has acquired two architectures: a large SGI Altix and a small Cray X-1. ARC is also partnering with other agencies to further leverage the effort through sharing on a broader front and more architectures.

Direct Readout Project

Bringing NASA Data and Technology to the Public

Over the past 3 decades, NASA's remote sensing spacecraft have been built with increasingly complex communication systems and instruments. To access and use data gathered by these platforms, the public needs dedicated data processing algorithms and other tools that keep up with this complexity.

GSFC's Direct Readout (DR) Project, led by the ESDCD's Patrick Coronado, is developing software, methodologies, and standards to make remote sensing data from satellites and other platforms more readily accessible through real-time Direct Broadcast (DB).

The Mobile NPP In-Situ Ground System. Image credit: Lara Clemence, GST

This project is funded primarily to help the public acquire and use data from the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP). The NPP is a joint mission of NASA, the National Oceanic and Atmospheric Administration (NOAA), and the

Department of Defense (DOD), scheduled to launch in 2006. The NPP will act as a bridge between NASA's Earth Observing System (EOS) and the NPOESS satellite, which is scheduled to launch later in the decade.

"When Terra, flagship satellite of EOS, launched in 1999, a shortage of instrument-specific information and algorithms delayed public use of the vast amounts of collected data," says Coronado. "NASA wants to speed up this process to help the public get involved in Earth science and make use of NASA data within a couple of months of launch."

NPP instruments are being built to the standards promoted by the DR Project, ensuring compatibility and continuity of data transmission and ground station characteristics. EOS satellites have been serving as testbeds for this project so that ". . . as soon as NPP is turned on, the public will hit the ground running," says Coronado. "With our technologies, users will have immediate access to NPP data in real time to create their own Earth science products relevant to their local needs and issues."

DR technologies are freely available on the Web through the project's Direct Readout Portal. They can be used on any PC with a Linux operating system. The Portal accommodates a growing community of more than 500 users in academia, government, and other public and private sectors from 15 countries. Included are 27 remote sensing organizations and over 50 commercial manufacturers that implement DR technologies and standards in their own satellites and remote sensing instruments.

Technologies available through the Portal include:

- Multi-Mission Scheduler (MMS) software automatically prepares a client ground system to acquire data whenever an NPP satellite is nearby.

- Real-Time Software Telemetry Processing System (RT-STPS) reformats raw data from a transmitting satellite in preparation for further processing.

- Simulcast (Real-time MODIS (RTModis)) generates images in near real time from all instruments onboard NPP in addition to MODIS onboard NASA's Terra and Aqua satellites.

- NPP Earth Science Technology Office (ESTO) Portal for Science, Technology and Environmental Research (NEpster) is a secure, virtually connected peer-to-peer network in which clients make their archives of remote sensing data available to one another.

- Mobile NPP In-Situ Ground System (NISGS) is a self-contained software system housing the above components.

The project uses these components to build low-cost, flexible test systems with commercial off-the-shelf components that can accommodate long or short range networks and a variety of sensor platforms and antennas.

The DR Project's custom-built mobile control van and antenna trailer enables testing of a full range of remote sensing capabilities, including capturing raw data, calibrating and generating data, and generating end products. Test applications currently include:

- Design of algorithms for use in a DR environment, available through the DR Portal. Earth scientists can obtain the following MODIS data in near real time (within 2 hours): surface reflectance, vegetation index, fire mapping, snow and ice cover, and cloud masking.

- Design of the Remote Internet Protocol Communications (RIPCom) system, a collaboration with the U.S. Forest Service that enables real-time capture of fire instrument data. RIPCom consists of a remote sensing aerial platform that functions as a network node on a 3-to-11-megabits-per-second (depending on range) high-speed wireless communications network using an Ethernet-to-Radio-Frequency connection.

- Implementation of DR technologies that enabled the JASON educational project to present near-real-time MODIS data as part of the 2003 "From Shore to Sea" expedition.

http://directreadout.gsfc.nasa.gov
http://www.gsfc.nasa.gov/topstory/2003/firesgsfc.html
http://www.jasonproject.org

SVS

Media Event on Arctic Warming Uses SVS Images

A NASA study has documented a trend of unusual warming of Arctic temperatures over recent decades that appears to be rapidly accelerating. The rise in temperature has been accompanied by other environmental changes such as a reduction in Arctic sea ice.

This Arctic trend, which indicates significant warming in much of the Arctic region, was the topic of a televised Earth Science Update (ESU) held at NASA Headquarters on October 23, 2003. The ESU featured movies produced by the Scientific Visualization Studio (SVS) to help illustrate the Arctic changes. In addition, enlarged stills from the

SVS movies were used as a dramatic backdrop for the update.

The media event, carried live by NASA TV, was the most widely reported ESU to date, reaching an audience estimated at 12 to 15 million worldwide. It was reported on the CBS Network News with Dan Rather, as well as the CBS Early Show and about 25 local and 11 national markets. News vehicles included the New York Times, the Associated Press, the Los Angeles Times, and the Washington Post. International coverage included releases from England, Canada, Japan, India, South Africa, and Iran.
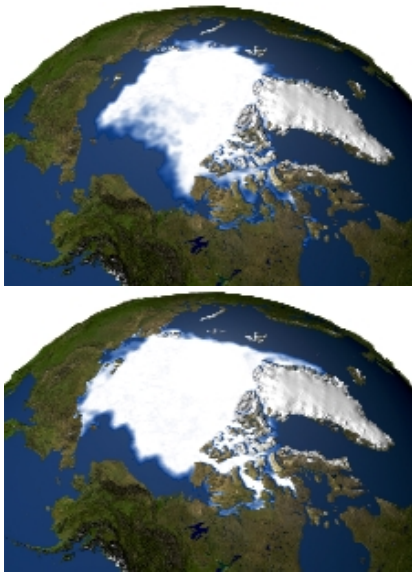
Frames comparing the years 1979 (bottom) and 2002 (top) from an animation featured during the ESU. The animation showed the annual minimum sea ice extent and concentration for 24 years, from 1979 to 2003. The lowest level of sea ice on record was in 2002. Sea ice data were from the DMSP SSMI and Nimbus-7 SSMI. The true-color backdrop of the Earth was created with GSFC's "Blue Marble," a dataset composited mostly from MODIS data. The Earth's topography was from GTOPO-30, a global topography model from the U.S. Geological Survey.
Image Credit: SVS

NASA Headquarters program scientist Abdalati Waleed moderated the event. Josefino Comiso, author of the NASA study, was one of five panelists. Comiso, a research scientist with GSFC's Oceans and Ice Branch, monitored temperatures over the entire Arctic using satellite data. His study "Warming Trends in the Arctic from Clear Sky Satellite Observations" was published in the November edition of the Journal of Climate, Volume 16, Number 21, pages 3,498 to 3,510.

Additional panelists included Michael Steele, an oceanographer with the University of Washington, Seattle; David Rind, a climate modeler with NASA Goddard Institute for Space Studies (GISS); and Mark Serreze, a research scientist with the University of Colorado, Boulder. They described the trend and the possible causes and global effects.

They discussed the complex interactions of a multi-faceted system of Earth processes, which can be understood through large-scale investigations involving computational modeling. The update was followed by a question and answer period by reporters from the national media.

The SVS worked with Comiso to produce two movies: one is a visualization of 20-year surface temperature anomalies using data from the Advanced Very High-Resolution Radiometer (AVHRR) on NOAA's Polar-Orbiting Environmental Satellite (POES) while the other is an update of a previous visualization depicting the rapidly declining perennial sea ice cover in the Arctic. The updated SVS movie used perennial sea ice data from 1987 to 2003 from DOD's Defense Meteorological Satellite Program's (DMSP) Special Sensor Microwave Imager (SSMI). The DMSP builds satellites that monitor Earth's meteorological, oceanographic, and solar-terrestrial physics environments. Sea ice data prior to 1987 were from NASA's Nimbus-7 Scanning Multi-channel Microwave Radiometer (SMMR). The movies of annual minimum sea ice extent and concentration included one showing a 25-year period from 1979 to 2003 and the other showing a moving 4-year average during the same period.

The visualizations were featured together with related NASA articles released on the day of the update. "Seasons of Change: Evidence of Arctic Warming Grows" ran on NASA's home page the following day; and "Recent Warming of Arctic May Affect Worldwide Climate" ran as a GSFC Top Story. "Dwindling Arctic Ice" ran as a NASA Earth Observatory article the following day. Although the question of what is causing the Arctic trend remains to be answered, the scientists stressed that these changes are happening now and could have significant consequences in the years to come.

http://svs.gsfc.nasa.gov/vis/a000000/a002800/a002850/index.html
http://svs.gsfc.nasa.gov/vis/a000000/a002800/a002837/index.html
http://www.nasa.gov/vision/earth/environment/Arctic_Warming_ESU.html
http://www.gsfc.nasa.gov/topstory/2003/1023esuice.html
http://earthobservatory.nasa.gov/Study/ArcticIce

Computational Technologies Project

NASA's SC2003 Exhibit Highlights Latest Advances

Eclipsing last year's record attendance by more than 300, the SC2003 conference drew an international audience of 7,641 people to the Phoenix Civic Plaza November 17–21, 2003. For the seventh year, NASA mounted a research exhibit to highlight

NASA's SC2003 research exhibit included demonstrations from five NASA Centers, CT Project investigation teams, and collaborators. Image credit: Gina Morello, ARC

The ESDCD's Shujia Zhou presented an Earth System Modeling Framework-Common Component Architecture prototype for coupling climate models. Image credit: Jarrett Cohen, GST

its latest high-performance computing and networking advances. GSFC joined ARC, Glenn Research Center, the Jet Propulsion Laboratory (JPL), and Langley Research Center in this agency-wide effort.

The Computational Technologies (CT) Project had one of the largest presences in the NASA exhibit, being represented by five investigation teams as well as ESDCD staff and collaborators. CT's Information Officer, Jarrett Cohen of GST, coordinated ESDCD participation.

The Earth System Modeling Framework (ESMF) core implementation team at the National Center for Atmospheric Research provided an overview of ESMF objectives and described current development efforts. Team members included Cecelia DeLuca, Nancy Collins, Earl Schwab, and Silverio Vasquez. At an adjacent pedestal, the ESDCD's Shujia Zhou, of Northrop Grumman Information Technology/TASC, demonstrated a prototype version of the ESMF incorporating features from the Department of Energy's Common Component Architecture. The prototype includes a back-end component interface and a front-end graphical user interface for coupling climate models, such as atmosphere and ocean models. Zhou also presented how dynamical cores from two modified versions of NASA operational atmospheric general circulation models can interoperate using the ESMF.

Daniel Martin of Lawrence Berkeley National Laboratory showed simulations created using the Chombo software framework and the ChomboVis visualization tool. Chombo applies adaptive mesh refinement (AMR) to microgravity fluid dynamics and space physics applications such as star formation.

An additional AMR-based software framework—called IBEAM—models gamma-ray bursts (see ESDCD News, Winter 2002–03). The dynamics of a relativistic fireball shock wave and other features made up an IBEAM demonstration given by Douglas Swesty of the State University of New York at Stony Brook, Alan Calder of the University of Chicago, and Brian Foote of the University of Illinois at Urbana-Champaign.

Results from CT's QuakeSim and Montage investigations were shown by Christopher Catherasoo, Joseph Jacob, Daniel S. Katz, and Heidi Lorenz-Wirzba of JPL. The QuakeSim team's GeoFEST software recently simulated 500 years of postseismic surface deformation in Southern California after the Landers and Northridge earthquakes. Their Virtual California software captured 1,000 years of surface deformation caused by simulated earthquakes. A 6-foot-wide light box displayed a mosaic of Two Micron All Sky Survey (2MASS) telescope images created using the Montage software (see ESDCD News, Summer 2003).

Truth-N-Beauty Software has been developing a collection of "sci-interactives" that illustrate CT investigator science through animated games in which users can change simulation parameters. Interactives shown by Thaddeus Pawlicki included Albedo, Aurora, Coronal Mass Ejections, and Invasive Species. A Macromedia Flash version of the ESMF wall poster was also part of his demonstration.

CT partially funds the Clemson University Parallel Architecture Research Laboratory (PARL), whose staff demonstrated software technologies for Beowulf clusters. Their Coven Problem Solving Environment helps users run and monitor applications, while the Parallel Virtual File System Version 2 provides concurrent access to data distributed

across multiple servers. PARL personnel at SC2003 were Walter Ligon, Daniel Stanzione, Philip Carns, Nathan Debardeleben, and Patil Vishal.

Besides participating in the NASA exhibit, the ESMF team held their first Industry Partners Forum in Phoenix on November 19. It was attended by roughly 40 software and hardware providers, including super-computer vendors, and developers of compilers, debuggers, and other high-performance computing tools. The ESMF technical lead team described the project's plans for fostering collaborations with the computing industry in the areas of portability and per-formance, including a three-tier performance evalua-tion strategy. Presenters included Venkatramani Balaji of the Geophysical Fluid Dynamics Laboratory, Christopher Hill of the Massachusetts Institute of Technology (MIT), and DeLuca.

http://ct.gsfc.nasa.gov
http://www.sc-conference.org/sc2003
http://www.truth-n-beauty.com/nasact
http://www.parl.clemson.edu

GSFC Computer on Display at New Smithsonian Museum

A first-of-its-kind high-performance computer built for GSFC is now on display at a new branch of the world's most popular museum. The Massively Parallel Processor (MPP) joins the Space Shuttle Enterprise, an Air France Concorde, and several hundred other air-craft and space artifacts at the Smithsonian National Air and Space Museum's Steven F. Udvar-Hazy Center, located at Washington Dulles International Airport in Chantilly, VA. The Center opened on December 15, 2003, to celebrate the 100th anniversary of the Wright brothers flying the first powered airplane.

The first-of-its-kind Massively Parallel Processor served GSFC scientists and engineers from 1983 to 1991. The computer is on display at the National Air and Space Museum's new Steven F. Udvar-Hazy Center. Image credit: NASA

In 1983, Goodyear Aerospace Corporation (now Lockheed-Martin Tactical Defense Systems Division) completed the MPP based on specifications from the

ESDCD (then known as the Space Data and Computing Division). The 16,384-processor comput-er introduced the concept of linking many proces-sors with a fast network, an approach that domi-nates the U.S. high-performance computing industry to this day. GSFC retired the MPP in 1991 and donated it to the Museum in 1995.

http://www.nasm.si.edu/museum/udvarhazy/artifacts_space.cfm#m

NCCS
Petabyte-Capacity Mass Storage System Deployed

To continue to fulfill the increasing demand for stor-age resources, the NASA Center for Computational Sciences (NCCS) deployed a new petabyte (PB)-capacity robotic mass storage system on September 16, 2003. The new architecture consists of a Sun Fire 15000 server running Hierarchical Storage Management (HSM) software with Sun's StorEdge Performance Suite and Utilization Suite, also known as Storage and Archive Manager-Quick File System (SAM-QFS). The system replaces the NCCS's legacy UniTree mass storage system that ran on an aging Sun E10000.

The SAM-QFS system was selected to provide the NCCS with a stable mass storage environment that features a peak data transfer performance of up to 3 times the UniTree system, which had a peak perform-ance of 12.8 GiB* (13.7 GB) per second. The new system is designed to meet the future demands of the user community, with scaling capability to at least 20 PB of data storage within the next 5 years. Chief among the new system's features is its cluster-based configuration. A cluster of two production domains gives users a highly available environment, since the disk and tape storage of the entire system can be accessed through either domain.

The NCCS is transparently migrating the approxi-mately 291 TiB (320 TB) of existing UniTree data to SAM-QFS as the NCCS switches over to the new mass storage system. During this transition, the new system must provide seamless access to all legacy UniTree data while simultaneously handling 1.8 to 2.7 TiB (2 to 3 TB) per day of new data daily, the regular NCCS user workload. To accomplish this requirement, the directory and file information for the entire UniTree system were reproduced onto the new system in just a few days prior to the start of the switchover. This "metadata" consists of about 350,000 directories and 10 million files configured to give users access to their data in their usual man-ner throughout the migration process.

Approximately 1.2 TiB (1.4 TB) of data were moved to SAM-QFS on its second full day of operation. As of December 15, 2003, 72.5 TiB* (79.7 TB) of data have been migrated into the SAM system. Automated migration scripts running transparently to NCCS users are moving the remaining UniTree data into SAM-QFS within the next few months, requiring a daily migration of roughly 2.7 to 4.5 TiB (3 to 5 TB) of data.

Ellen Salmon of the NCCS is leading and providing technical direction for the data migration and switch to the new system, with integration support from Computer Sciences Corporation (CSC). Key technical personnel assisting in this effort are Adina Tarshish of the NCCS; Sanjay Patel, Marvin Saletta, and Daniel Duffy of CSC; Steven Wolf of STK; Michael Rouch, Robert Caine, and Randy Golay of Sun Microsystems; and Jeff Paffel and Nathan Schumann of Instrumental.

In December 1998 the International Electrotechnical Commission (IEC), the leading international organization for worldwide standardization in electrotechnology, approved as an IEC International Standard names and symbols for prefixes for binary multiples for use in the fields of data processing and data transmission. Examples:

Binary multiple prefix: 1 Gibibyte (GiB)=$(1,024)^3$ bytes

SI prefix: Gigabyte (GB)=$(1,000)^3$ bytes

Binary multiple prefix: 1 Tebibyte (TiB)=$(1,024)^4$ bytes

SI prefix: Terabyte (TB)=$(1,000)^4$ bytes
For more information:
http://physics.nist.gov/cuu/Units/binary.html

NAS and NCCS Complete Data Migration

The Data Assimilation Office (DAO), now part of NASA's Global Modeling and Assimilation Office (GMAO), was directed in September of 2002 to migrate its data processing from the NASA Advanced Supercomputing (NAS) Division at NASA ARC to the NCCS. The DAO and the NCCS immediately began to prepare a plan to migrate the data processing and 159.16 TiB (175 TB) of data to the NCCS facility. Through a series of procurements with SGI and StorageTek, the NCCS augmented the SGI computing and data processing platforms by adding CPUs, memory, disk storage, tape drives, tape media, and networking infrastructure.

NCCS support staff was increased, with additions to the CSC contract and expertise from SGI. With help from SGI Professional Services and members of the NAS staff, all 159.16 TiB of data were duplicated to tape, shipped across country, and merged into the SGI Data Management Facility (DMF) system maintained by the NCCS. The migration was completed on September 3, 2003.

Staff from both GSFC and ARC worked together in support of the successful migration effort: Personnel from GSFC included Thomas Schardt and Ellen Salmon; Nicko Acks of CSC; and Al Ruddick, Harper Pryor, Dan Kokron, Doug Collins, and Rob Lucchesi of GSC. Personnel from ARC included Alan Powers, Elizabeth Cox , Matt Cary, and Theresa Mellen of CSC; Brad Cook of STK; Daniel Dowling, Dale Brantly, Toby Liftee, Linda Lee, and Scott Zurawski of SGI; and Jose Zero, David McNab, and Ignazio Capano of Halcyon Systems.

NCCS Develops Standard Earth Science Application Suite

The NCCS is preparing a benchmarking suite of representative applications from NASA's ESE. The primary purpose of this suite is to encourage vendors of high-end computing platforms to analyze these applications for potential performance and portability issues. The suite will also be used to estimate the potential performance of these applications for future hardware acquisitions. Eugene Mirvis of AMTI and members of the ESE community are assembling and maintaining the suite that includes not just source code, but also associated data, documentation, and means for verification. During the initial phase, the suite consists of only one application—the finite-volume General Circulation Model (fvGCM) of the GMAO—which consumes a significant fraction of NCCS computational resources. Other applications that are likely to be added in the near future include modelE climate modeling from GISS and ECCO ocean modeling and assimilation from JPL.

Visiting Scholar Presentation

Robert Numrich, a Goddard Visiting Fellow in Earth Sciences, presented his work on applying Co-Array Fortran (CAF), a next-generation parallel programming paradigm, to problems in the Earth sciences. By minimally extending the current Fortran standard, Numrich has demonstrated improved parallel performance and vastly superior ease of implementation. The talk described the features of CAF, illustrated how it has been used in climate modeling problems, and looked at how it could fit into the ESMF. The January 6, 2004, presentation was held at GSFC as part of the Visiting Fellows Seminar Series sponsored by the Goddard Earth Sciences & Technology (GEST) Center of the University of Maryland, Baltimore County. Numrich is a Senior Research Associate at the Minnesota Supercomputing Institute, University of Minnesota. He is working at the NCCS for the duration of his 1-year part-time appointment.

Paper Presented

Richard Glassbrook of AMTI and James McGalliard of GSA presented the paper "Performance Management at an Earth Science Super-Computer

Center" to the Computer Management Group Conference in Dallas, Texas, on December 12, 2003. This paper is a case study of performance management at the NCCS.

How to Access NCCS Resources

To gain access to the computing resources of the NCCS, follow the instructions available at
http://nccs.nasa.gov/resources/main.html

NCCS User Services provides the NCCS user community with a wide variety of services including Help Desk support. The Help Desk is staffed Monday through Friday from 8 a.m. to 8 p.m. e.s.t., except for Federal holidays and GSFC closures. NCCS User Services may be contacted via telephone at 301-286-9120 or email at tag@nccs.gsfc.nasa.gov.

Outreach

MU-SPIN Fosters Minority Institution Involvement in Upcoming $2.4M CAN

The Minority University-SPace Interdisciplinary Network (MU-SPIN) Project held interactive cyber conferences on October 29, 2003, and November 12 and 13, 2003, to help foster Minority Institution (MI) involvement in its new Cooperative Agreement Notice (CAN).

The CAN "Institutes for Collaborative Research and Education (ICRE) at Network Resources and Training Sites (NRTS)," which will span from Fiscal Year (FY) 05 to FY10, will help prepare the next generation of Minority Institution scientists and technologists to contribute to current and future Earth observing and space exploration missions. The official CAN announcement will be available during the Spring/Summer of FY04.

MU-SPIN is fostering Minority Institution involvement in an upcoming CAN by holding cyber conferences. Morgan State University (MSU) was one of the hosting institutions on October 29, 2003. Image Credit: MSU

The goal of MU-SPIN's 3 cyber conferences was to help Minority Institution faculty and student teams compete for the approximately $2.4M per year for 5 years in upcoming NASA research opportunities associated with the CAN. Conference attendees learned about the CAN, which will fund multiple ICREs focusing on specific future announcements. They also learned about the CAN selection process. Scientists from the NASA Enterprises and missions presented plans for future activities and awards, providing opportunities for MU-SPIN schools to become part of that future.

Each cyber conference had from 70 to 100 registered attendees. The conferences were held at the seven MU-SPIN NRTS, which serve as MU-SPIN's regional hubs across the country, and the University of Houston-Downtown. In addition, the cyber conferences were available as interactive Webcasts. http://muspin.gsfc.nasa.gov/can/

MU-SPIN Web Site Goes Interactive

The MU-SPIN Project has transformed its Web site to promote participation by students and educators from Minority Institutions, and involve the NASA community. The site redesign, led by Eduardo Takamura of ADNET, has many interactive features, including a forum for on-line discussion groups on a broad range of topics; a listserv featuring mailing lists dedicated to education, research, technology, and general announcements; and a NASA recruiting tool for students and educators from Minority Institutions who are seeking research opportunities at the Agency and at MU-SPIN partner institutions. Other new features include a detailed calendar of events and an improved search engine.
http://muspin.gsfc.nasa.gov

Earth Alert in the News

GSFC released a news article on October 28, 2003, about the Maryland Emergency Management Agency's (MEMA) use of the Earth Alert System (EAS). "NASA Funded Earth Alert System to Aid MEMA in Disasters" was published in GSFC on-line venues, including the GSFC Earth Observatory and the GSFC Top Story Web site on the same date. Science Daily ran an adapted on-line version of the article on October 30, 2003.

EAS is a Web-based, low-cost personal-warning system that uses satellite communications, geographical information systems, and state-of-the-art microelectronics to provide a wide range of assistance during natural and manmade disasters.

MEMA officials have been exploring the system's capabilities as part of a 1-year pilot program. MEMA used EAS during Hurricane Isabel for real-time tracking of field response personnel, to send messages to and from the field, and to report dam-

ages. In the storm's aftermath, MEMA Disaster Recovery Center personnel continued to use EAS to provide critical logistics support.

In upcoming work with MEMA, the lead contractor of EAS via the Technology Transfer Office is planning to design a wireless communications system to bring emergency information technologies indoors. A system consisting of PDA devices and a wireless 802.11b network will enable alerting of emergency management personnel in buildings or around a mobile network. The wireless system would also help with evacuation from buildings, relief and disaster mitigation and recovery, and emergency information exchange.

Fostered by NASA's Technology Transfer Office, EAS is a collaboration among NASA, the Federal Emergency Management Agency, MEMA, the National Emergency Management Association (NEMA), NOAA/National Weather Service, and private industry partners. Fred Schamann of the ESDCD's Science Communications Technology Branch (SCTB) at GSFC assists with technical oversight of EAS, including testing and deployment.

http://www.gsfc.nasa.gov/news-release/releases/2003/03-93.htm
http://earthobservatory.nasa.gov/Newsroom/NasaNews/2003/2003
102816102.html
http://www.gsfc.nasa.gov/topstory/2003/1010earthalert.html
http://www.sciencedaily.com/releases/2003/10/031030062554.htm

VSEP: Two Decades of New Talent

The Visiting Student Enrichment Program (VSEP) is announcing its 20th year anniversary with the 2004 session. VSEP has been chaired by Marilyn Mack of the SCTB since the early 1990s.

A 2003 VSEP student from a local high school presents her project. Image credit: Marilyn Mack, GSFC

Over the past two decades, hundreds of computer-related projects have benefited from the VSEP students from high school through graduate levels that have come to GSFC from across the country. Last year, 18 students worked with their mentors to achieve results on both Earth and space sciences projects, such as mapping carbon dioxide in the Arctic, implementing image registration algorithms, and validating software for the James Webb Space Telescope (see ESDCD News, Fall 2003).

Just as GSFC projects benefit from the work performed by the students, NASA benefits through encouraging students to pursue NASA-related careers. Although there is no promise of future employment, the ESDCD and other areas of NASA currently have several employees who were students in either the VSEP program or similar NASA educational programs.

Says Mack, "We have been proud of the number of graduates that have not only continued their careers in computer science, but have also come back to Goddard as contractors or civil servants."

VSEP is seeking GSFC sponsors and/or mentors for the 2004 Summer program. For more information about VSEP or to learn about sponsoring or mentoring a student, telephone Marilyn Mack at 301-286-4638 or send email to Marilyn.J.Mack@nasa.gov.
http://vsep.gsfc.nasa.gov

Updates
2004 AMS Fellow

Richard Rood, Chief of the ESDCD, was elected as a Fellow of the American Meteorological Society (AMS) in January 2004. The honor was bestowed in recognition of his many years of outstanding contributions to the modeling of advective processes in the atmosphere.

He led the formation of GSFC's Data Assimilation Office (DAO) (now the Global Modeling and Assimilation Office). As head of the DAO from 1992 to 1998, he helped expand the scope of data assimilation from numerical weather prediction applications to more generalized Earth science, such as climate and chemistry. He also managed the design and deployment of supercomputing platforms to support Earth science computations.

He has served on scientific and computational advisory panels for several national laboratories and institutions including the European Center for Medium-range Weather Forecasts. In 2002, he served as a U.S. delegate on joint climate research initiatives with Italy and Japan. He co-authored the 2001 National Academy of Sciences/National Research Council report on improving the nation's climate modeling capability. In 2000, he was the lead author of a report on high-end climate modeling and computing for the Office of Science and Technology Policy. He is also an author on more than 70 refereed journal submissions, as well as several United Nations Environment Programme international assessment documents.

He received the World Meteorological Organization Norbert Gerbier Award in 2003, a NASA Outstanding Leadership Medal in 2000, and a NASA Exceptional Scientific Achievement Medal in 1995.

Charles S. Falkenberg Award

Jeff de La Beaujardière of the SCTB was presented the 2003 Charles S. Falkenberg award on December 10, 2003, at the annual meeting of the American Geophysical Union (AGU). The award is for "a scientist under 45 years of age who has contributed to the quality of life, economic opportunities and stewardship of the planet through the use of Earth science information and to the public awareness of the importance of understanding our planet."

De La Beaujardière received this award for his advocacy and leadership in advancing interoperability standards for geospatial Web services, bringing the benefits of geographic information and services to the world across any network, application, or platform. In 2002 to 2003, he led development of the Geospatial One-Stop Portal initiative, which will provide a foundation for creation of a new seamless Earth Science Gateway that will bring Earth-related data to scientists and the public. He represented NASA in the Geospatial Applications and Interoperability (GAI) Working Group of the U.S. Federal Geographic Data Committee. As a member of the Open GIS Consortium (OGC) Technical Committee, he served as editor of OGC and International Organization for Standardization (ISO) specification documents and contributed to test beds and pilot projects for open-standard interfaces.

With NASA's Geospatial Interoperability Office, formerly the Digital Earth Office, he championed the use of interoperability standards at NASA for sharing Earth images and data among NASA centers and partners. He also helped develop NASA's Public Use of Remote Sensing Data Program and was lead Web developer of the GLOBE Visualization project.
http://www.agu.org/meetings/fm03/fm03honors.html

WMS Specification Approved

The Web Mapping Service (WMS) was approved by the ISO for worldwide release as Draft International Standard ISO DIS 19128. The WMS is a specification that allows easy assembly of data from multiple sources by providing a standard protocol for requesting geospatial information over the Internet. This information can include displays of NASA satellite observations, model output, and maps.

For information or questions contact:
esdcdnews@webserv.gsfc.nasa.gov

De La Beaujardière edited WMS as part of NASA's role as a strategic member of the OGC. The OGC is a group of over 250 companies, agencies, and universities working together to make geographic information and services available across any network, application, or computer platform.

Invasive Species Forecasting: Awards and Keynote Address

John Schnase of the ESDCD has become a co-investigator on two NASA Research Announcements (NRA) awarded November 1, 2003, to the NASA/USGS invasive species team. Both proposals were submitted in response to NRA-03-OES-03, "Interdisciplinary Science in the NASA Earth Science Enterprise":

- "Fingerprinting Native and Non-native Biodiversity in the United States, Phase I: The Western U.S." will address the lack of effective techniques in invasive species monitoring to rapidly assess or "fingerprint" biodiversity at large spatial scales. This work will refine ecological forecasting capabilities for mapping a broader range of biodiversity and invasive species patterns and hotspots on greatly expanded areas, from local to national scales.

- "The Distribution and Abundance of Bird Species: Towards a Satellite, Data-Driven Avian Energetics and Species Richness Model" will address the question of why birds occur where and when they do by developing approaches to building a satellite data-driven model. This groundbreaking ecological study is one of the first to model organisms and their interactions with the landscape and with each other, building on similar studies of plant communities.

http://invasivespecies.gsfc.nasa.gov/newsidstjs.html
http://invasivespecies.gsfc.nasa.gov/newsidsjas.html

Schnase gave the keynote address "Emerging Science Applications for Geospatial Information" at the International Workshop on Next Generation Geospatial Information Systems held at MIT. Schnase explained how the invasive species problem provides an ideal platform for advancing the science and technology of ecological forecasting and broadening the use of geospatial information. The workshop was held on October 19 to 21, 2003, and sponsored by the National Science Foundation.
http://dipa.spatial.maine.edu/NG2I03

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